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## Does dance-based therapy improve balance and mobility in older adults?

Emily Ann Dodge  
*Dominican University of California*

Florina Mendoza-Battle  
*Dominican University of California*

Tanya Elesia Orgill  
*Dominican University of California*

Kitsum Li  
*Department of Occupational Therapy, Dominican University of California*

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## AOTA Critically Appraised Papers Series

### Evidence Exchange

*\*A product of the American Occupational Therapy Association's  
Evidence-Based Literature Review Project*

#### CRITICALLY APPRAISED PAPER (CAP)

##### **FOCUSED QUESTION**

**Does dance-based therapy improve balance and mobility in older adults?**

Krampe, J. (2013). Exploring the effects of dance based therapy on balance and mobility in older adults. *Western Journal Of Nursing Research*, 35(1), 39–56.

<http://dx.doi.org/10.1177/0193945911423266>

##### **CLINICAL BOTTOM LINE:**

Falls are prevalent in older adults. Falls can cause injury or may even result in death. Dance-based therapy was used as a form of exercise in an attempt to increase balance and mobility and thereby potentially reduce the risk of falls in older adults. This study used a 2-group randomized convenience sample of 27 older adults and an exploratory pretest–posttest design to examine the effects of a dance-based therapy on balance and mobility in older adults. The older adults had a mean age of 85 years and were recruited from one aging-in-place (AIP) facility in the Midwest of the United States. The older adults in the intervention group attended 3 sessions per week for 6 weeks of the Ledbed Method™ (TLM) dance therapy program while continuing to participate in their regular activities. Each dance session lasted for 45 minutes and participants were allowed to make up any missed session after the initial 6-week program. The control group participated in their regular weekly exercise activities, which were not specified in the article. Statistical significant differences were not found in balance and mobility between the two groups. However, the study found that participants in the treatment group who attended a minimum of 14 out of 18 sessions demonstrated a mild (0–.2) to moderate (.2–.5) effect size on balance and mobility with the dance based-therapy program. On the basis of this study, use of a 6-week dance based therapy to improve mobility and balance in older adults requires further investigation to confirm its therapeutic value.

##### **RESEARCH OBJECTIVE(S)**

List study objectives.

This study explores the effects of dance-based therapy on balance and mobility in older adults living in an AIP facility.

**DESIGN TYPE AND LEVEL OF EVIDENCE:**

Level I study: Exploratory pretest– posttest randomized controlled design
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Limitations (appropriateness of study design):

Was the study design type appropriate for the knowledge level about this topic? *Circle yes or no, and if no, explain.*

<b>YES/NO</b>	
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**SAMPLE SELECTION**

How were subjects selected to participate? Please describe.

The subjects were selected from a single AIP facility located in the Midwestern region of the United States. The recruitment process included informational demonstration to the residents, recruitment posters, and individual interviews with residences who met the inclusion criteria within the facility.
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**Inclusion Criteria**

Each participant completed the Mini-Mental State Exam (MMSE). Participants had to score a 23 or higher on the MMSE to demonstrate the cognitive level deemed necessary to follow instructions. Additionally, participants were required to demonstrate the ability to stand for short periods of time (not specified) with or without assistance.
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**Exclusion Criteria**

Not meeting the inclusion criteria, health issues (not specified), or refusal.
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**SAMPLE CHARACTERISTICS**

$N = 27$

% Dropouts	11% Of the 27 participants recruited, 3 participants did not complete the post-intervention measurement due to hospitalization, illness, or death of a spouse.
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#/ (%) Male	10/ 37%		#/ (%) Female	17/ 63%
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Ethnicity	There were 26 Caucasian participants and one Asian participant.
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Disease/disability diagnosis	Common conditions in the sample groups included arthritis, diabetes, early-stage Alzheimer's disease, and heart disease.
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Check appropriate group:

<input checked="" type="radio"/> <20/study group	20–50/study group	51–100/study group	101–149/study group	150–200/study group
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## INTERVENTION(S) AND CONTROL GROUPS

### Group 1

Brief Description	The intervention group participated in TLM dance-based therapy. Each session included 10 minutes of lymphatic warm-up movements, 30 minutes of an active dance-based therapy, and 5 minutes of cool down. The dance-based therapy consisted of low-impact aerobics and stretching, mixed with dance movements. Various dance movements such as jazz and ballet specifically choreographed for older adults were performed.
Setting	NR
Who Delivered?	Principal investigator.
Frequency?	18 dance sessions, 3 times per week. Multiple sessions were offered at various times during the week. Make-up sessions were offered for an additional 2 weeks after the initial 6 weeks.
Duration?	6 to 8 weeks.

### Group 2

Brief Description	The control group participants did not receive dance-based therapy intervention and were allowed to carry on their usual routine, which was not specified.
Setting	NR
Who Delivered?	NR
Frequency?	NR
Duration?	6 weeks

Intervention Biases: Circle yes or no and explain, if needed.

### Contamination

YES/NO	
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### Co-intervention

YES/NO	The control group exercise or usual routine programs were not reported. The study did not indicate whether any members of the control group were currently participating in any type of leisure dance program. If a group member was participating in a dance program as part of their normal routine, this may have lead to a possible co-intervention.
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#### Timing

<input checked="" type="radio"/> YES/ <input type="radio"/> NO	The intervention may have been too short in duration to show a statistical significant effect in the outcome.
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#### Site

N/A	The study did not specify where the intervention and control groups completed their sessions.
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#### Use of different therapists to provide intervention

<input checked="" type="radio"/> YES/ <input type="radio"/> NO	The primary investigator, who was certified in TLM, provided the intervention.
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### MEASURES AND OUTCOMES

Complete for each relevant measure when answering the evidence-based question:

Name of measure, what outcome was measured, whether the measure is reliable and valid (as reported in article—yes/no/NR [not reported]), and how frequently the measure was used.

Newton's (2001) Multi-Directional Reach Test (MDRT) was used to measure voluntary postural control. It is used to measure the distance a person is willing and capable of reaching towards various directions away from their base of support. The test was administered twice, pre- and post intervention. The MDRT has shown to have good internal consistency (Cronbach's  $\alpha=.84$ ); test-retest reliability was high at (.92). Validity was NR.

Name of measure, what outcome was measured, whether the measure is reliable and valid (as reported in article—yes/no/NR [not reported]), and how frequently the measure was used.

GAITRite CIR Systems (2007) was used to measure temporal and spatial parameters of the sample's mobility patterns, which are a culmination of velocity, step length, and functional ambulation profile. GAITRite CIR was administered pre- and post- intervention. Velocity was measured by dividing distance ambulated by time taken to ambulate distance. Step length was measured by subtracting the the heel center of the left foot from the heel center of the right foot in the previous step along a line of progression. The same measurement was done for the right foot.

Name of measure, what outcome was measured, whether the measure is reliable and valid (as reported in article—yes/no/NR [not reported]), and how frequently the measure was used.

Nelson and colleagues (1999) functional ambulation profile (FAP) scoring system was used to provide an overall gait score from the data collected from GAITRite CIR. The FAP is calculated by dividing the step length by leg length ratio to step time. The FAP was done pre- and post- intervention. Reliability and validity were not reported.

#### Measurement Biases

Were the evaluators blind to treatment status? *Circle yes or no, and if no, explain.*

YES <input checked="" type="radio"/> NO <input type="radio"/>	The evaluators were involved in other projects at the same facility and thus were not blinded to the control and treatment groups.
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Recall or memory bias. *Circle yes or no, and if yes, explain.*

YES <input checked="" type="radio"/> NO <input type="radio"/>	
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Others (list and explain):

<p>Participants received an incentive of a \$25 Walmart card after the post-measurements. Providing incentive to the intervention group may have inevitably prompted some of the participants to stay in the study due to the incentive. Hawthorne effect may have occurred, because the participants were aware that they were being assessed.</p>
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## RESULTS

List results of outcomes relevant to answering the focused question.

Include statistical significance where appropriate ( $p < 0.05$ ).

Include effect size if reported.

<p>Of the intervention participants, 7 (54%) completed 18 sessions of dance therapy, 3 (23%) attended 10 to 15 sessions, and 3 (23%) attended 3 to 7 sessions of dance therapy.</p> <p>The post-measurements in balance for the intervention group did not show significant improvement when compared to the control group. The effect size (ES) of MDRT between the intervention and control groups are as follows: Forward Reach .27, Right Reach .10, Left Reach .26 and Backwards Reach .48. The ES of the high attendance (defined as attending a minimum of 14 sessions, <math>n = 9</math>) vs. the control group are as follows: Forward Reach .35, Right Reach .19, Left Reach .38 and Backwards Reach .43. Hence, the treatment participants who had high attendance during the intervention had a moderate (.2–.5) effect in the Forward Reach test, mild (0–.2) effect on the Right Reach and a moderate effect on the Left and Backwards Reach when compared with participants in the control group.</p> <p>The post-measurements in mobility did not show significant improvement when comparing the intervention group and the control group. The ES of mobility measures between the intervention and control groups are as follows: velocity .01, step length differential (SLD) .01 and Functional Ambulation Profile (FAP) .14. The ES of high attendance vs. the control are as follows: velocity .16, SLD .02 and FAP .12. Again, the treatment participants who had high attendance demonstrated a mild effect over those in the control group on velocity, SLD and FAP.</p>
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Was this study adequately powered (large enough to show a difference)? *Circle yes or no, and if no, explain.*

YES <input checked="" type="radio"/> NO <input type="radio"/>	This study was an interim study to a larger-powered trial.
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Were appropriate analytic methods used? *Circle yes or no, and if no, explain.*

<input checked="" type="radio"/> YES/ <input type="radio"/> NO	Due to the small sample size, the researchers used Cohen's <i>d</i> to measure the strength of the relationship between the intervention and control groups. The researchers then completed another Cohen's <i>d</i> analysis separately on the participants with high attendance in the intervention sessions. The researchers used the Wilcoxon Rank Sum Test to examine the direction and difference in the pretest and posttest scores of both groups.
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Were statistics appropriately reported (in written or table format)? *Circle yes or no, and if no, explain.*

<input checked="" type="radio"/> YES/ <input type="radio"/> NO	The statistics were appropriately reported in written format and were also listed in table format.
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## CONCLUSIONS

State the authors' conclusions that are applicable to answering the evidence-based question.

Although the findings were not statistically significant, the author maintained that the study had a mild or moderate effect on components of balance and mobility for the high attendee treatment participants. These findings suggested that dance therapy could have a moderate effect on balance and mobility in older adults. The author recommended that a larger study needs to be completed and suggested increasing the duration of the intervention and recruiting a larger sample group from various AIP facilities. Lastly, the author also suggested to use blinded assessors for future study.

## References

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This work is based on the evidence-based literature review completed by Emily Dodge, OTS; Florina Mendoza, OTS; Tanya Orgill, OTS; and Kitsum Li, OTD, OTR/L, Faculty Advisor, Dominican University of California.

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